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TAXONOMY OF THE GENUS *VESPER* (APIACEAE)

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ABSTRACT

A species group often broadly treated within *Cymopterus* but historically segregated as the genus *Phellopterus* Coulter & Rose 1900 is restored here to generic rank. A new name for the genus, **Vesper** Hartman & Nesom, is provided because of the earlier *Phellopterus* Benth. 1867. Six species are included: **Vesper bulbosus** (A. Nels.) Hartman & Nesom, comb. nov., **Vesper constancei** (Hartman) Hartman & Nesom, comb. nov., **Vesper macrorhizus** (Buckley) Hartman & Nesom, comb. nov., **Vesper montanus** (Nutt. in Torr. & Gray) Hartman & Nesom, comb. nov., **Vesper multinervatus** (Coulter & Rose) Hartman & Nesom, comb. nov., and **Vesper purpurascens** (A. Gray) Hartman & Nesom, comb. nov. The genus is distinct in its combination of thick taproots, acaulescent habit but consistent production of pseudoscapes, compact inflorescences, white to cream, pink, or purple petals, dorsally compressed mericarps with 4–5, thin, broad dorsal and lateral wings and with 3–9 oil tubes per interval, and particularly by its involucel bracts basally connate, prominently nerved, and totally white to purplish-scarious or with broad white-scarious margins.

KEY WORDS: Apiaceae subfamily Apoideae, *Cymopterus*, *Vesper*, Sun and Downie

Many generic segregates have been proposed among species of the "perennial, endemic western North American Apiaceae subfamily Apoideae" (sensu Downie et al. 2010) toward describing patterns of diversity within this group. Most of the wing-fruited species and their generic-level segregates, however, have recently been treated within a relatively inclusive *Cymopterus* Raf. (e.g., Mathias & Constance 1944-45; Cronquist 1997; Turner 2003; Welsh et al. 2008), currently including about 40 species. Limits of the genus *Aletes* were expanded (e.g., Weber 1984) to encompass some of the species.

The present study confirms the morphological and phyletic integrity of one strongly differentiated species group (the *Phellopterus* group) — it is treated here as a distinct genus, though requiring a new name. Six species are included: *Cymopterus bulbosus*, *C. constancei*, *C. macrorhizus*, *C. montanus*, *C. multinervatus*, and *C. purpurascens*.

This species group is monophyletic in recent molecular analyses based on sequence variation in nrDNA ITS and cpDNA *rps*16 intron and *trn*F-L-T (e.g., Sun & Downie 2010). In a strict consensus tree of 240 minimal length trees derived from MP analysis of combined molecular and morphological characters for 129 accessions of North American Apioideae, the *Phellopterus* group has values of 100% for bootstrap estimates and Bayesian posterior probability. The group also is consistently and strongly coherent in morphology, as indicated by the characters in the diagnosis below.

Except for the recent addition of *Cymopterus constancei* by Hartman (2000), this same species group was first segregated by Coulter and Rose (1900) as the genus *Phellopterus* and later also recognized by Mathias (1930) at generic rank. Although most recent treatments have placed the *Phellopterus* group within *Cymopterus*, species keys consistently separate the species as a group by the same set of earlier-recognized characteristic features.

VESPER R.L. Hartman & G.L. Nesom, **nom. nov.** *Phellopterus* (Nutt. ex Torr. & A. Gray) Coulter & Rose, Contr. U.S. Natl. Herb. 7: 166. 1900 (nom. illeg., not *Phellopterus* Benth. 1867 = *Glehnia* F. Schmidt ex Miq.]. *Cymopterus* sect. *Phellopterus* Nutt. ex Torr. & A. Gray, Fl. N. Amer. 1: 623. 1840. **TYPE**: *Cymopterus montanus* Nutt. in Torr. & A. Gray

Bentham's *Phellopteris* comprised the single entity *Phellopteris littoralis* (A. Gray) Benth. now treated as *Glehnia leiocarpa* Mathias or *Glehnia littoralis* var. *leiocarpa* (Mathias) Boivin.

Cymopterus sect. *Leptocnemia* Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 624. 1840. **TYPE**: *Cymopterus campestris* Nutt. in Torr. & Gray

Distinct in its combination of thick taproots, acaulescent habit but consistent production of pseudoscapes, compact inflorescences, white to cream, pink, or purple petals, dorsally compressed mericarps with 4–5, thin, broad dorsal wings (3) and lateral wings (2) and with 3–9 oil tubes per interval, and particularly by its involucel bracts basally connate, prominently nerved, and totally white to purplish-scarious or with broad white-scarious margins. Outer umbellets of staminate flowers, inner ones of pistillate or staminate flowers in part; carpophore bifid to base or absent.

Figure 1. *Vesper bulbosus* from Montezuma Co., Colorado, 27 March 2005. Photo ©Al Schneider, www.swcoloradowildflowers.com.

Figure 2. *Vesper bulbosus*. Same plant as Fig. 1.

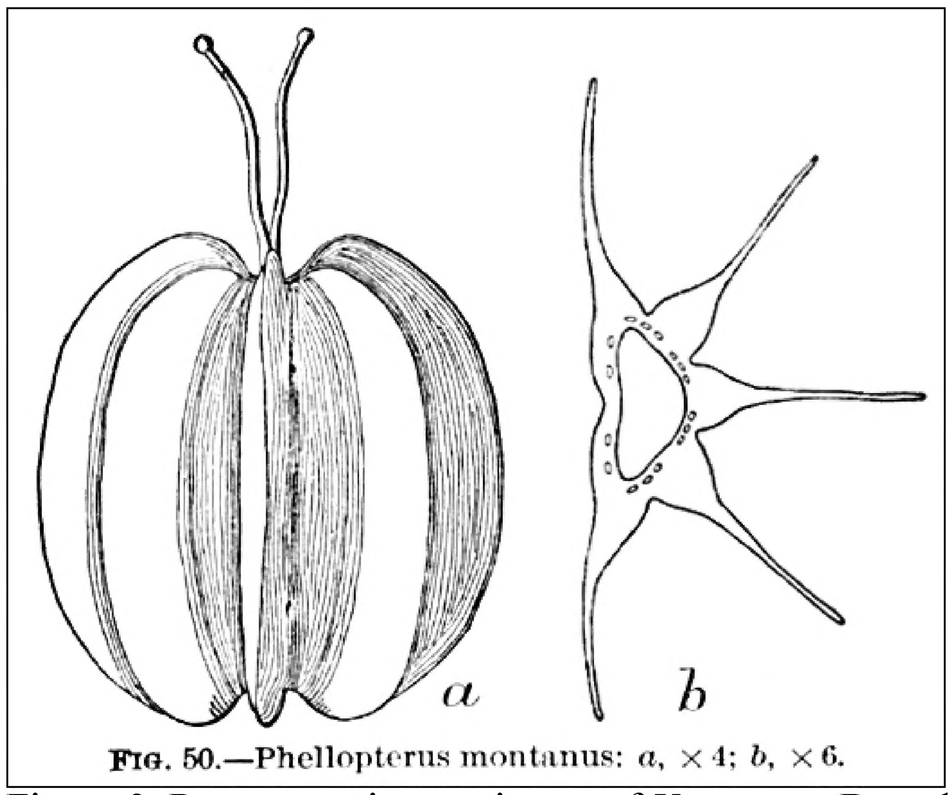

FIG. 50.—Phellopterus montanus: *a*, ×4; *b*, ×6.

Figure 3. Representative mericarps of *Vesper*. a. Dorsal view. b. Cross-section showing dorsal compression, wings, and oil tube. From Coulter and Rose (1900).

Figure 4. *Vesper constancei* from Dolores Co., Colorado, May 2010. Photo ©Al Schneider, www.swcoloradowildflowers.com.

The new name of the genus is from Latin, *vesper*, evening or west, sometimes referring to the "evening star" (usually Venus) seen at sunset in the western sky. The name alludes to the team of Sun and Downie, who have provided molecular analyses (Feng-Jie Sun and Stephen R. Downie 2004, 2010; and including Downie et al. 2002) indicating that evolutionary relationships among many of the currently and historically recognized genera of western North American Apioideae are complex, apparently reticulate.

KEY TO THE SPECIES

1. Fruiting peduncles shorter than or equalling the leaves; mericarp wings conspicuously enlarged at the base ..... 4. **Vesper montanus**
1. Fruiting peduncles equalling or longer than the leaves; mericarp wings not conspicuously enlarged at the base.

2. Involucel bractlets with lacerate-fringed distal margins ..... 3. **Vesper macrorhizus**
2. Involucel bractlets with entire or irregularly toothed or lobed margins.

3. Involucre mostly a low hyaline sheath; involucel bractlets commonly purplish to rosy, 5–8-nerved; pedicels 0–1 mm long ..... 5. **Vesper multinervatus**
3. Involucre of 1–8, oblong to obovate, often variously lobed bracts; involucel bracts greenish white to white, 1–3(–5)-nerved; pedicels 1–12 mm long.

4. Umbels in fruit tightly globose, rays 1–4(–8) mm long, pedicels 1–4 mm long; carpophores absent; fruit orbicular, 10–12 mm long ..... 6. **Vesper purpurascens**
4. Umbels in fruit relatively open, more or less flat-topped, rays 10–50 mm long, pedicels 5–12 mm long; carpophores well-developed; fruit oblong, 8 mm long.

5. Involucel bractlets connate for 1/3–2/3 or more of length, the free portion usually abruptly enlarged distally, broadly ovate to orbicular, with mostly 1 vein, occasionally with 1–2 pairs of shorter lateral veins, parallel to divergent or branched ..... 1. **Vesper bulbosus**
5. Involucel bractlets connate to 1/3 of length, the free portion gradually expanding distally, obovate to spatulate, with mostly 3 veins arising from the base, parallel below, gradually flaring distally, equal or nearly so ..... 2. **Vesper constancei**

1. **Vesper bulbosus** (A. Nelson) R.L. Hartman & G.L. Nesom, **comb. nov.** *Cymopterus bulbosus* A. Nelson, Bull. Torrey Bot. Club 26: 241. 1899. *Phellopterus bulbosus* (A. Nelson) Coulter & Rose, Contr. U.S. Natl. Herb.7: 168. 1900. **TYPE: USA. Wyoming**. [Sweetwater Co.:] Green River, 14 Jun 1898, *A. Nelson 4709* (holotype: RM digital image!; isotype: MO digital image!, US digital image).

Cymopterus utahensis var. *eastwoodiae* M.E. Jones, Proc. Calif. Acad. Sci., ser. 2, 5: 685. 1895. *Phellopterus purpurascens* var. *eastwoodiae* (M.E. Jones) Coulter & Rose, Contr. U.S. Natl. Herb. 7: 169. 1900. **TYPE: USA. Colorado**. La Plata Co.: Durango, no date, *A. Eastwood s.n.* (holotype: CAS digital image!; isotypes: COLO (mixture of *C. bulbosus* with a few branches of *C. constancei*), GH, US digital image!).

Plants acaulescent, tufted, weakly or not aromatic; taproot 8–20 or more cm long, 0.8–4 cm in diameter, enlarged variously, especially towards base. **STEMS**: pseudoscapes usually 1 or 2, often conspicuous, each arising 1–7 cm below ground (1–10 cm long) among remnants of old leaf sheaths and often 1–2 leaves; scarious sheaths 1–3. **LEAVES** somewhat fleshy, thus often minutely wrinkled on drying, glabrous or margins rarely scaberulous, not viscid, glaucous; petioles 1–8 cm long; blades lanceolate to broadly ovate in outline, 2–8 cm long, 1.5–5 cm wide, pinnate-pinnatifid to bipinnate-pinnatifid below, with 3–6 usually opposite pairs of lateral leaflets, leaflets sessile to petiolulate with distinct midribs, ultimate leaf segments 0.3–5 mm long, mostly 0.1–2.5 mm wide, oblong to elliptic, often overlapping, terminal leaflet variously pinnatifid to pinnate-pinnatifid into oblong to elliptic segments, apices rounded to apiculate. **INFLORESCENCE** of 1–8 or more umbels, in fruit loose to somewhat congested, rounded, 1–5 cm wide; peduncles 3–15 cm, in fruit equalling or longer than the

leaves, glabrous; involucre of 6–8 bracts 3–10 mm long, bracts ovate to broadly so, often fused into a cup, white, scarious with 1 green to brown vein; rays 5–9, 2–10 mm long, to 35 mm long in fruit; involucel of 6–8 bractlets, ovate to orbicular, usually rounded and notched, 4–6 mm long, fused in lower 30–70%, white, scarious with usually 1 green nerves arising from base, or with 1 or 2 pair of shorter lateral veins, parallel to divergent or branched, margin entire; pedicels 1–3 mm long, to 10 mm long in fruit. **FLOWERS** with calyx teeth 0.2–0.6 mm long or obsolete, lanceolate to ovate; petals white or cream to purple; styles 1.5–2 mm long; anthers cream to dark purple, outer umbellets of staminate flowers, the inner of pistillate or some staminate flowerss. **FRUIT** 6–11 mm long, broadly elliptic to oblong, tan to purplish, wings usually 5, 2–4 mm high, usually straight, smooth, membranous, not conspicuously enlarged at the base; oil tubes 3–4 per interval, 4–7 on commissure; carpophore bifid to base.

Flowering April to early May. Gumbo or clay flats, slopes, and badlands; 1340–2590 m; Arizona, Colorado, New Mexico, Texas, Utah, Wyoming.

2. **Vesper constancei** (R.L. Hartman) R.L. Hartman & G.L. Nesom, **comb. nov.** *Cymopterus constancei* R.L. Hartman, Brittonia 52: 136, figs. 1–2. 2000. **TYPE: USA. Wyoming.** Lincoln Co.: US. Hwy 189, 1.5 mi SW of Diamondville, rolling plains, with *Artemisia*, *Atriplex*, etc., 7000 ft, 11 May 1981, *R.L. Hartman 125222* (holotype: RM!; isotypes: BRY!, COLO!, GH!, KANU!, MO! digital image!, NY! digital image!, UC!, UNM!).

Plants acaulescent, tufted, weakly or not aromatic; taproot 3–11 or more cm long, 0.4–2 cm in diameter, enlarged towards base. **STEMS**: pseudoscapes usually 1–3, conspicuous, each arising 2–10 cm below ground (3–18 cm long) among remnants of old leaf sheaths and 1 or 2 leaves; scarious sheaths 1–3. **LEAVES** somewhat fleshy, thus often minutely wrinkled on drying, usually glabrous or margins sometimes scaberulous, not viscid, often glaucous; petioles 5–10 cm long; blades lanceolate to broadly ovate in outline, 2.5–8 cm long, 1.5–3 cm wide, bipinnate-pinnatifid to tripinnate below, with 3–5 usually opposite pairs of lateral leaflets, leaflets sessile to petiolulate with distinct midribs, ultimate leaf segments 0.2–2.5 mm long, mostly 0.5–1 mm wide, oblong to elliptic, often overlapping, terminal leaflet variously pinnatifid to bipinnatifid into oblong to elliptic segments, apices round to obtuse or apiculate. **INFLORESCENCE** of 1–8 or more umbels, in fruit loose, convex to rounded, 2–5 cm wide; peduncle 1–12 cm, in fruit equalling or longer than the leaves, glabrous; involucre of 1–8 bracts 4–10 mm long, bracts oblong to obovate, often variously lobed, white, scarious with 1–4 purple veins; rays 3–6, 3–5 mm long, to 30 mm long in fruit; involucel of 4–6 bractlets, obovate to spatulate, broadly rounded to truncate, sometimes cleft, 4.5–7 mm long, fused in lower 20–30%, white, scarious with usually 3 dark green to purple nerves arising from base, parallel below, gradually flaring distally, equal or nearly so or lateral pair somewhat shorter, margin entire or irregularly toothed or lobed; pedicels 1–3 mm long, to 12 mm long in fruit. **FLOWERS** with calyx teeth 0.2–0.7 mm long or obsolete, triangular to ovate; petals white or cream to purple; styles 2–3 mm long; anthers purple. **FRUIT** 7–14 mm long, broadly elliptic to suborbicular, tan to purplish, wings 4–5, mostly 3–4 mm high, usually straight, smooth, membranous, not conspicuously enlarged at the base; oil tubes 2–3 per interval, 4–7 on commissure; carpophore bifid to base.

Flowering early February to late April. Sandy to loamy soils in shrublands and woodlands; 1260–2690 m; Arizona, Colorado, New Mexico, Utah, Wyoming.

Cymopterus constancei and *C. purpurascens* are similar in their involucel bractlets with 3–5 veins equal or nearly in length, parallel below but partly flaring above, with broadly rounded to truncate apices.

3. **Vesper macrorhizus** (Buckley) R.L. Hartman & G.L. Nesom, **comb. nov.** *Cymopterus macrorhizus* Buckley, Proc. Acad. Nat. Sci. Philadelphia 1861: 455. 1862. *Phellopterus macrorhizus* (Buckley) Coulter & Rose, Contr. U.S. Natl. Herb. 7: 167. 1900. **TYPE: USA. Texas**. Prairies, N of Austin, Mar 1860, *S.B. Buckley s.n.* (holotype: PH digital image!).

Cymopterus montanus var. *pedunculatus* M.E. Jones, Proc. Calif. Acad. Sci., ser. 2, 5: 686. 1895. **LECTOTYPE** (designated here): **USA. Texas**. [Dallas Co.:] Dallas, rocky prairies, "Mar, Apr" 1880, *J. Reverchon 1031* (US digital image!).

Jones (p. 687) noted that "The types of this variety are Woolson's specimen from Dallas, Texas; Reverchon's, same locality, with narrower wings." At US, these are *G.C. Woolson 96* from 1873 and *J. Reverchon 160* from Mar 1880.

Plants acaulescent, tufted, weakly or not aromatic; taproot 2.5–7 cm long, 1–3(–5) cm in diameter, enlarged variously, subglobose to fusiform. **STEMS**: pseudoscapes usually 1–3, usually conspicuous, each arising 3–10 cm below ground (3–8 cm long) among remnants of old leaf sheaths; scarious sheaths 1–4. **LEAVES** somewhat fleshy, thus often minutely wrinkled on drying, glabrous or margins usually scaberulous or roughened, not viscid, usually glaucous; petioles 0.5–10 cm long; blades lanceolate to broadly ovate in outline, 2–5(–8) cm long, 1.5–3(–5) cm wide, pinnate-pinnatifid to bipinnate-pinnatifid below, with 3–6 usually opposite pairs of lateral leaflets, leaflets sessile or nearly so with distinct midribs, ultimate leaf segments 0.5–2 mm long, mostly 0.5–1.5 mm wide, oblong to ovate, often overlapping, terminal leaflet variously pinnatifid to pinnate-pinnatifid into oblong to spatulate segments, apices rounded to apiculate. **INFLORESCENCE** of 1–4 umbels, in fruit loose to somewhat congested, rounded, 1–4 cm wide; peduncles 2–20 cm, in fruit equalling or longer than the leaves, glabrous to papillate roughened, especially distally; involucre usually of 1–4 bracts (scarious with green vein) ca. 1 mm, distinct, sometimes absent; rays 5–14(–18), 4–11 mm long, to 30 mm long in fruit, often papillate-roughened; involucel of 2–4 bractlets, primary bracts ovate to broadly spatulate or widely obtrullate, 2.5–6 mm long, usually distinct, white, broadly scarious usually with a green patch in lower 1/3–1/2 with nerves highly branched (or reticulate) proximally and extending apically (veins 10–16, often very unequal in length, usually nearly parallel), contrasted against the scarious margin, smaller ones often with a ovoid patch of green (in fruit nerves prominent, often brown or purple), margin lacerate-fringed distally; pedicels 0.5–1 mm long, to 3 mm in fruit. **FLOWERS** with calyx teeth 0.2–0.4 mm long or obsolete, lanceolate to ovate; petals white; styles 1–1.5 mm long; anthers purple to purple-black. **FRUIT** 4.5–7 mm long, broadly elliptic to oblong, tan to purplish, wings usually 5, 1.5–2 mm high, usually straight, smooth, membranous, not conspicuously enlarged at the base; oil tubes 3–4 per interval, 6 on commissure; carpophore bifid to base.

Flowering mid March to early April. Chalk slopes, limestone ridges and hillsides, limestone gravel and silt, red clay, gypsum exposures, rocky and sandy prairies, mesquite-grassland, sandy roadsides; 200–700 m; New Mexico, Oklahoma, Texas.

4. **Vesper montanus** (Nutt. in Torr. & A. Gray) R.L. Hartman & G.L. Nesom, **comb. nov.** *Cymopterus montanus* Nutt. in Torr. & A. Gray, Fl. N. Amer. 1: 624. 1840. **TYPE: USA.** [protologue: "High bare plains of the Platte, toward the Rocky Mountains"], Platte plains, Rocky Mts, *T. Nuttall s.n.* (holotype: BM digital image!; isotypes: K digital image!, NY digital image!).

Cymopterus campestris Nutt. in Torr. & Gray, Fl. N. Amer. 1: 624. 1840. **TYPE: USA.** [protologue: "Plains of the Platte, near the Rocky Mountains"], "Rocky Mts., in places inundated in Winter," *T. Nuttall s.n.* (holotype: BM digital image!; isotype: GH).

Phellopterus camporum Rydb., Bull. Torrey Bot. Club 31: 574. 1904. **TYPE: USA. Colorado.** [Pueblo Co.:] Mesas near Pueblo, 14 May 1900, *P.A. Rydberg and F.K. Vreeland 5825* (holotype: NY digital image!; isotype: US digital image!).

In the protologue, Rydberg cited "*Rydberg and Vreeland 5825* (type, in flower) and *5824* (in fruit)."

Phellopterus macrocarpus Osterh., Muhlenbergia 6: 59. 1910. **TYPE**: **USA. Colorado**. Bent Co.: Las Animas, 16 Jun 1909 and 16 Apr 1910, *G.E. Osterhout 3906* (holotype: NY digital image!).

PLANTS acaulescent, tufted, weakly or not aromatic; taproot 7–14 or more cm long, 0.8–3 cm in diameter, enlarged variously, especially towards base (often rounded). **STEMS**: pseudoscape usually 3–7, congested, each arising 1–2 cm below ground (0.5–6 cm long) among remnants of old leaf sheaths; scarious sheaths 1–4. **LEAVES** somewhat fleshy, thus often minutly wrinkled on drying, scaberulous on margins and often leaves, not viscid, usually glaucous,; petioles 0.5–5(–8) cm long; blades narrowly to broadly ovate in outline, 3–8.5 cm long, 2–5.5 cm wide, mostly pinnate-pinnatifid, rarely bipinnate-pinnatifid below, with 4–5 usually opposite pairs of lateral leaflets, leaflets sessile, rarely petiolulate with distinct midribs, ultimate leaf segments 1–4 mm long, mostly 0.5–1.5 mm wide, ovate to oblong, mostly overlapping, terminal leaflet variously pinnatifid into oblong to elliptic segments, apicies generally apiculate. **INFLORESCENCE** of 3–7 or more umbels, in fruit congested, occasional loose, rounded, 1–3 cm wide; peduncles 1–4(–9) cm, in fruit shorter than or equalling the leaves, scaberulous; involucre of rudimentary, bracts or two to four to 2–4(–9) mm long, oblong to obovate, often white to purple rays 5–9, 3–10 mm long, lengthening little in fruit; involucel of 5–7 bractlets, lanceolate to elliptic to broadly orbicular, apiculate to notched, 2–3(–4) mm long, distinct or nearly so, central patch green, lanceolate with lateral nerves decreasing in length laterally, scarious margins equal to 2x width of patch, margin entire; pedicels 1–2 mm long, lengthening little in fruit. **FLOWERS** with calyx teeth 0.1–0.2 mm long or obsolete, triangular to obate, petals white to purple; styles 2–2.5 mm long; anthers purplish. **FRUIT** 18–23 mm long, broadly elliptic to oblong, tan to purplish wings 5, 4–5 mm high, straight to wavy, smooth, membranous, conspicuously enlarged at the base; oil tubes 3–4 per interval, 4–6 on commissure; carpophore absent. Plants in the vicinity of Pueblo, Colorado, are robust with long pedicels and were mistakenly identified by Mathias as *Cymopterus bulbosus*.

Flowering April to early May. Grassland plains and hillsides in sandy or sandy loam; 900–2250 m; South Dakota, Colorado, Kansas, Nebraska, New Mexico, Oklahoma, Texas, Wyoming.

5. **Vesper multinervatus** (Coulter & Rose) R.L. Hartman & G.L. Nesom, **comb. nov.** *Phellopterus multinervatus* Coulter & Rose, Contr. U.S. Natl. Herb. 7: 169. 1900. *Cymopterus multinervatus* (Coulter & Rose) Tidestr., Proc. Biol. Soc. Wash. 48: 41. 1935. **TYPE**: **USA. Arizona**. [Mohave Co.:] Peach Springs, May 1884, *J.G. Lemmon s.n.* (holotype: US digital image!).

PLANTS acaulescent, tufted, weakly or not aromatic; taproot 8–15 or more cm long, 0.8–3.5 or more cm in diameter, enlarged variously, especially towards base (often rounded). **STEMS**: pseudoscapes usually 1 or 2, often conspicuous, each arising 1–7 cm below ground (1–10 cm long) among remnants of old leaf sheaths; scarious sheaths 1–3. **LEAVES** somewhat fleshy, thus often minutely wrinkled on drying, glabrous or margins rarely roughened, not viscid, dull green to glaucous; petioles 1–8 cm long; blades broadly ovate to triangular in outline, 2–10 cm long, 1.5–9 cm wide, pinnate-pinnatifid to bipinnate-pinnatifid below, with 3–6 usually opposite pairs of lateral leaflets, leaflets sessile to petiolulate (petiolules to 1.5 mm long) with distinct midribs, ultimate leaf segments 0.2–5 mm long, mostly 0.1–2 mm wide, oblong to elliptic, frequently not overlapping, terminal leaflet variously pinnatifid to pinnate-pinnatifid into oblong to elliptic segments, apices generally rounded (margins and apices curved adaxially). **INFLORESCENCE** of 1–6 or more umbels, in fruit loose to somewhat congested, rounded, 2–5 cm wide; peduncles 6–18 cm, in fruit equalling or longer than the leaves, glabrous; involucre of rudimentary, often a collar, or with one or two bracts to

0.8 mm long, oblong to obovate, white to purple, scarious with several near parallel veins; rays 7–19, 3–10 mm long, lengthening little in fruit; involucel of 5–8 bractlets, obovoid to orbicular, usually apically rounded, 7–9 mm long, fused in lower 40–65%, mostly purple when mature, scarious margin thin to 1/4 width of fruit, nerves 5–9 or more, primarily parallel, often branched but then branches closely parallel, extending the full length of bractlets, margin entire or distally notched or apiculate; pedicels 1–3 mm long, some lengthening to 6 mm in fruit. **FLOWERS** with calyx teeth 0.2–0.4 mm long or obsolete, rounded; petals white to purplish; styles 2–2.5; anthers purple. **FRUIT** 18–23 mm long, broadly elliptic, tan to purplish, wings usually 5, 4–5 mm high, usually straight, smooth, membranous, not conspicuously enlarged at the base; oil tubes 3 in intervals, 5-6 on commisure; carpophore absent.

Flowering mid March to early April. Shrublands and woodlands often on sand or loam of rolling plains; 850–1830 m; Arizona, California, Nevada, Utah; n. Mexico.

6. **Vesper purpurascens** (A. Gray) R.L. Hartman & G.L. Nesom, **comb. nov.** *Cymopterus montanus* var. *purpurascens* A. Gray, Rep. Colorado River 4: 15. 1861. *Cymopterus purpurascens* (A. Gray) M.E. Jones, Zoë 4: 277. 1893. *Phellopterus purpurascens* (A. Gray) Coulter & Rose, Contr. U.S. Natl. Herb. 7: 168. 1900. **LECTOTYPE** (designated here): **USA. Arizona.** [Coconino Co.:] San Francisco Mountains, no date, *J.S. Newberry*[?] *s.n.* (GH).

In the protologue, Gray noted "Stony hill-sides. Yampai valley (Camp 64; March 28) to San Franciso mountain, New Mexico. ... Oryabe, New Mexico." A specimen at NY is annotated as "isotype:" 1858, Newberry in Ives Colorado [???] (NY digital image!).

Cymopterus utahensis M.E. Jones, Proc. Calif. Acad. Sci., ser. 2, 5: 684. 1895. *Phellopterus utahensis* (M.E. Jones) Wooton & Standl., Contr. U.S. Natl. Herb. 16: 158. 1913. **TYPE: USA**. On page 684, Jones cited data for the Arizona collections *Jones 5098* (US digital image!), *Jones 5098h* (US digital image!), and *Jones 5098p* (US digital image!), but he noted (p. 685) that "This is No. 1685 of my Utah collection, and abounds on the clayey and gravelly plains, valleys and lower hillsides throughout Utah and Nevada."

Cymopterus utahensis var. *monocephalus* M.E. Jones, Proc. Calif. Acad. Sci., ser. 2, 5: 685. 1895. **TYPE: USA**. Utah. [Tooele Co.?:] Terminus, Jun-May 1890, *M.E. Jones s.n.* (isotype: MO digital image!).

Phellopterus filicinus Wooton & Standl., Contr. U.S. Natl. Herb. 16: 158. 1913. **TYPE: USA. New Mexico**. Grant Co.: Bear Mountain near Silver City, 17 Jun 1903, *O.B. Metcalfe 165* (holotype: US digital image!).

Plants acaulescent, tufted, weakly or not aromatic; taproot 5–18 or more cm long, 0.3–3 or more cm in diameter, enlarging variously, especially towards base. **STEMS**: pseudoscapes 1 or 2, sometimes conspicuous, each arising 1–5 cm below ground (1–7 cm long) among remnants of old leaf sheaths and often 1 to 5 leaves; scarious sheaths 1–3. **LEAVES** somewhat fleshy, thus often minutely wrinkled on drying, glabrous or margins rarely scaberulous, not viscid, glaucous; petioles 1–7 cm long; blades lanceolate to broadly ovate in outline, 1.2–7 cm long, 1.5–5 cm wide, pinnate-pinnatifid to bipinnate-pinnatifid below, with 3–6 opposite pairs of lateral leaflets, leaflets sessile to petiolulate with distinct midribs, ultimate leaf segments 0.1–5 mm long, mostly 0.1–2.8 mm wide, oblong to elliptic, often overlapping, terminal leaflet variously pinnatifid to bipinnatifid into lanceolate to ovate segments, apices mostly rounded. **INFLORESCENCE** of 1–8 or more yet obscurely distinct umbels, in fruit congested, usually globose, mostly 3–6 cm wide; peduncles 2–14 cm, in fruit equalling or longer than the leaves, glabrous; involucre usually of 8–10 bracts 8–15 mm long, bracts fused into a lobed to variously parted cup, white, scarious with 1–4 purple veins; rays 0–8, 1–8 mm long, lengthening little in fruit; involucels of 4–6 bractlets, often obscured by the involucre or fruit, oblong to elliptic, usually rounded, 4–7 mm long, fused in lower 30–60%, white, scarious with 1–4 dark green to purple nerves arising from base, equal or lateral veins to half as long, margin entire;

pedicels 0–5 mm long, lengthening little in fruit. **FLOWERS** with calyx teeth 0.2–0.5 mm long, lanceolate to rounded; petals white or purplish; styles 1.5–2 mm long; anthers purple. **FRUIT** 7–15 mm long, broadly elliptic to suborbicular, tan to purplish, wings 5, 2–4 mm high, straight to wavy, smooth, membranous, not conspicuously enlarged at the base; oil tubes 3–4 per interval, 4–7 on commissure; carpophore absent.

Flowering mid March to early June. Shrubland and woodland on sand or loam; 1300–2740 m; Arizona, California, Idaho, and Utah.

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